## REMARKS

Claims 1-4 and 7-10 are all the claims pending in the application. Claim 1 has been amended and claims 5-6 and 11-13 have been canceled. Support for amended claim 1 can be found, for example, in Example 2 of the present specification, and claim 1 has been amended to incorporate claims 5 and 6, which have been canceled.

Entry of the above amendments is respectfully requested.

Initially, the Examiner is respectfully requested to acknowledge Applicants' claim to priority under 35 U.S.C. § 119 and to confirm that the certified copy of the priority document have been received.

In addition, the Examiner is respectfully requested to acknowledge Applicants' claim to domestic priority under 35 U.S.C. § 119 and to confirm receipt of the verified English translation of provisional application no. 60/230,792 submitted on December 29, 2000 in the provisional application (copy of filing receipt is attached hereto).

### I. Rejection of claims 11-13 under 35 U.S.C. § 102/103

On pages 2-3 of the Office Action, claims 11-13 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Coronell et al., Aramaki et al., Woytek et al. or Japanese 2255513A ("JP ' 513").

It is respectfully submitted that the rejection is moot in view of the cancellation of claims 11-13. Accordingly, withdrawal of the rejection is respectfully requested.

### II. Rejection of claims 1 and 4-10 under 35 U.S.C. § 102 and §103

On page 3 of the Office Action, claims 1 and 7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP '513.

Basically, the Examiner asserts that JP '513 discloses the process of the present invention.

Applicants respectfully traverse this rejection and submit that JP '513 does not teach or suggest the method for producing nitrogen trifluoride of the present invention.

JP '513 discloses a method for producing nitrogen trifluoride by bringing fluorine gas and ammonia gas into contact at a temperature of 80°-250°C in the presence of a diluting gas, which may be hexafluoroethane. JP '513 discloses that about 6-8 moles of fluorine gas is reacted with 1 mole of ammonia gas, and that the yield on the basis of the fluorine gas is very low (although only the yield on the basis of the ammonia gas is disclosed).

In contrast, in the present invention, the reaction is performed at a temperature of 70°C or less according to amended claim 1, and preferably 50°C or less according to claim 2. The present specification discloses that if the reaction temperature exceeds 80°C, then some of the $NF_3$ may be decomposed. *See* page 8, lines 23-24 of the present specification. In addition, in the present invention, the concentration of ammonia gas fed is adjusted to 6 mol % or less and the concentration of fluorine gas fed is adjusted to 3 mol % or less.

Therefore, JP '513 does not anticipate the present invention according to claim 1 because JP '513 does not teach a reaction temperature of 70°C or less or the concentration of fluorine gas and ammonia gas fed.

In addition, one of ordinary skill in the art would not be motivated to react a fluorine gas and an ammonia gas at a temperature of 70°C or less based JP '513. Nor would one of ordinary skill in the art expect the advantages achieved as a result of the claimed reaction temperature based on the disclosure of JP '513.

Indeed, JP '513 actually teaches away from the use of a reaction temperature of 70°C or less. JP '513 teaches that a low reaction temperature is not preferred. That is, JP '513 discloses that the when the reactor is provided in the heating medium maintained to a temperature of 80 to 250°C, overheating in the reactor is unlikely caused since the reaction heat can be effectively dissipated through the heating medium at page 2, lines 2-8 (translation will be submitted in due course). JP '513 also discloses that clogging of the reactor is not caused since the temperature of the inner wall of the reactor is always higher than the solidification temperature of the by-product and that the temperature of the heating medium is more preferably 100 to 150 °C. Therefore, JP '513 teaches away from the use of a reaction temperature below 80°C.

The effect of the temperature difference can be seen from the Examples and Comparative Examples of the present specification. $NF_3$ gas is produced in a high yield according to the process of the present invention in which the specific temperature range is used. The Examiner's attention is respectfully directed to Example 1, which used a reaction temperature of 5°C and yielded about 69% $NF_3$ on the basis of $F_2$, whereas Comparative Example 1 used a reaction temperature above 70° C and did not produce any $NF_3$ gas.

In view of the above, it is respectfully submitted that the present invention according is not obvious in view of JP '513.

Further, on page 3 of the Office Action, claims 2 and 4-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '513, and on page 4 of the Office Action, claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '513 and further in view of JP 55116624 ("JP '624").

Each of claims 2, 4 and 7-10 (claims 5-6 have been canceled) depend, either directly or indirectly, from claim 1. Accordingly, it is submit that these claims are patentable over the cited prior art for at least the same reasons claim 1 is patentable over the cited prior art, particularly since JP '624 does not make up for the deficiencies of JP '513.

In view of the above, withdrawal of the foregoing rejections is respectfully requested.

## III. Rejection of claims 1-10 under 35 U.S.C. § 103(a)

On pages 4-5 of the Office Action, claims 1-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 5105411 ("JP '411").

The Examiner cites JP '411 as disclosing a method for producing nitrogen trifluoride by reacting ammonia and fluorine in the gaseous phase in the presence of a dilution gas. The Examiner takes the position that it would be obvious to carry out the process of JP '411 at a temperature of 80°C or less since it would be within the skill of one of ordinary skill in the art to determine a suitable or optimum temperature at which to carry out the process. In addition, the Examiner asserts that it would be within the skill of one of ordinary skill in the art to determine a suitable or optimum molar ratio of fluorine gas to ammonia gas.

Applicants respectfully traverse this rejection and submit that JP '411 does not teach or suggest the method for producing nitrogen trifluoride of the present invention.

JP '411 discloses reacting a $F_2$ gas with an $NH_3$ gas in the presence of a dilution gas. The proportion of the material gases to be fed into the reactor is preferably a fluorine gas/ammonia gas ratio of 1 to 30:1 and the concentrations of the material gases to be fed into the reactor are not particularly limited but ammonia gas and fluorine gas both may be diluted using a diluting gas. *See* [0019]-[0020]. In addition, JP '411 discloses that the reaction

temperature may be a temperature below the decomposition temperature of nitrogen trifluoride but it is preferable that the reaction temperature is maintained to a temperature in a range of room temperature to 120°C, particularly 30 to 70 °C. *see* paragraph [0022].

The prevention of explosion is an important point in the reaction of fluorine gas and ammonia gas, and the reaction can be performed in a safe range in the process of the present invention by using the concentrations of fluorine gas and ammonia gas of 3 mol% or less and 6 mol % or less, respectively. JP '411 is completely silent on this point. That is, JP '411 does not teach or suggest the concentration of fluorine gas and ammonia gas that is fed.

In addition, in the present invention, if the ratio of $NH_3$ to $F_2$ is more than 2, recovery of unreacted $NH_3$ gas is necessary, and when the ratio is less than one, unreacted $F_2$ gas remains in large amounts. *See* page 7, lines 24-30 of the present specification. The Examiner's attention is directed to, for example, Comparative Example 2, which used a ratio of $NH_3$ to $F_2$ less than 1 and unreacted $F_2$ gas remained in a large amount, and Comparative Example 3, which used a ratio of $NH_3$ to $F_2$ of more than 2 and unreacted $NH_3$ gas remained in a large amount. Therefore, the claimed concentration of $F_2$ gas and $NH_3$ gas fed provides unexpected advantages.

Accordingly, JP '411 fails to teach or suggest the present invention and one of ordinary skill in the art would not expect the results of the present invention based on the teachings of JP '411.

Further, on page 5 of the Office Action, claim 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '411 in view of JP '624.

As noted above, each of claims 9 and 10 depends indirectly from claim 1. Accordingly, it is submit that these claims are patentable over the cited prior art for at least the same reasons claim 1 is patentable over the cited prior art, particularly since JP '624 does not make up for the deficiencies of JP '411.

In view of the above, withdrawal of the foregoing rejections is respectfully requested.

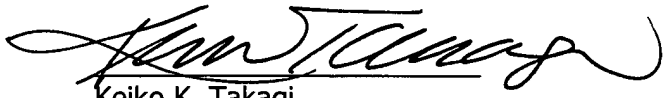
## IV. Conclusion

In conclusion, reconsideration of the §102 and §103 rejections and allowance of claims 1-4 and 7-9 is respectfully requested.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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